

(11)特許出願公開番号

特開平10-257482

(43)公開日 平成10年(1998)9月25日

| (51) Int.Cl. <sup>a</sup> | 識別記号 | P I           |   |
|---------------------------|------|---------------|---|
| H 0 4 N 7/18              |      | H 0 4 N 7/18  | J |
| B 6 0 K 35/00             |      | B 6 0 K 35/00 | Z |
| B 6 0 R 1/00              |      | B 6 0 R 1/00  | A |
| G 0 8 G 1/18              |      | G 0 8 G 1/18  | C |

審査請求 未請求 請求項の数5 OL (全 8 頁)

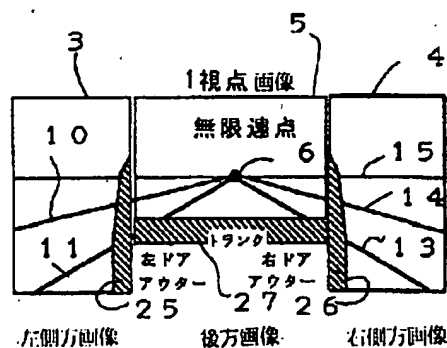
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|----------|-----------------|---------|--|
| (21)出願番号 | 特願平9-58718      | (71)出願人 | 000003997<br>日産自動車株式会社<br>神奈川県横浜市神奈川区宝町2番地 |
| (22)出願日  | 平成9年(1997)3月13日 | (72)発明者 | 隈本 健司<br>神奈川県横浜市神奈川区宝町2番地 日産<br>自動車株式会社内   |

(54)【発明の名称】 車両周辺状況表示装置

(57) 【要約】

【課題】 左右及び後方の画像を同時に液晶パネル上に表示する車両周辺状況表示装置において、瞬時に左右及び後方の道路状況を連続した情報として得、危険の事前回避をし易くした技術を提供すること。

【解決手段】 左右ドアミラー近傍に取り付けられたＣＣＤカメラにより撮影した車両左右側面画像と、後部に取り付けられたＣＣＤカメラにより撮影した車両後部画像とを、インストルメントパネルに設置した液晶パネルに表示する車両周辺状況表示装置において、左右側方及び後方の３つの画像の無限遠点を合わせて１つの無限遠点６を設け、１つの仮想視点から見たように左右側方及び後部画像を画像合成した。



## 【特許請求の範囲】

【請求項1】 左右ドアミラー近傍に取り付けられたCCDカメラにより撮影した車両左右側方画像と、後部に取り付けられたCCDカメラにより撮影した車両後部画像とを、インストルメントパネルに設置した液晶パネルに表示する車両周辺状況表示装置において、左右側方及び後方の少なくとも3つの画像の無限遠点を合わせ、1つの仮想視点から見たように左右側方及び後部画像を画像合成したことを特徴とする車両周辺状況表示装置。

【請求項2】 前記3つの画像を表示する画面において、左右側方画像と後方画像の像の大きさを合わせるように、後方画像の縦幅を左右側方画像の縦幅よりも小さくしたことを特徴とする請求項1記載の車両周辺状況表示装置。

【請求項3】 低中速走行のときは、画像サイズを縮小し、高速走行のときは画像サイズを拡大する請求項1または請求項2記載の車両周辺状況表示装置。

【請求項4】 ウィンカーを出すと同時にパネルに表示される画像が車両進行方向の画像にシフトすること、を特徴とする請求項1ないし3項いずれか一項記載の車両周辺状況表示装置。

【請求項5】 路面の凹凸による走行中の車体の変位をセンサーにより検知し、車体の変位に伴う画像の揺れを除去したことを特徴とする請求項1ないし4項いずれか一項記載の車両周辺状況表示装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は車両の周辺状況を表示する装置に関し、特に左右及び後方の画像を同時に液晶パネル上に表示する車両周辺状況表示装置に関するものである。

## 【0002】

【従来の技術】 車両外部の状況を把握する方法としては、後方はルームミラー、側方はドアミラーまたはフェンダーミラーによるものが現在の市販車の主流である。それ以外では、CCDカメラによるインストルメントパネルの液晶パネルへの映像表示も一部実用化または試作品として公開されている。例えばウインドシールドとインストルメントパネル上面の境目にCCDカメラで撮影した左右側方及び後方の映像を表示するものや、車が接近してきたときに警告と共に接近してきた車の映像が表示されるものがある。

## 【0003】

【発明が解決しようとする課題】 しかしながら上記従来の表示は、左右側方、後方の映像が独立して映し出されるものであり、ドライバーは全ての周辺状況を把握するためには個々の映像を1つずつ認識しなければならないため時間がかかる。上記従来例の、CCDカメラで撮影した左右側方及び後方の画像を表示するものに関して

例えば、各画面同士が離れており、ルームミラーとドアミラーの機能に近く、一つ一つの画面を見ていく必要がある。警告と共に接近して車の映像が表示されるものに関していえば側方或いは後方画面のみが表示され、全体は把握しづらい。本発明は従来の問題点に鑑みてなされたものであり、その目的は、瞬時に左右及び後方の道路状況を連続した情報として得、全体の把握をし易くすることである。

## 【0004】

10 【課題を解決するための手段】 本発明は前記目的を達成するために、左右側方及び後方の少なくとも3つの画像の無限遠点を合わせ、1つの仮想視点から見たように左右側方及び後部画像を画像合成し、左右側方画像と後方画像の像の大きさを合わせるように、後方画像の縦幅を左右側方画像の縦幅よりも小さくし、画像サイズを低中速走行のときは、小さく、高速走行のときは大きくし、ウィンカーを出すと同時にパネルに表示される画像が曲がる方向の画像にシフトし、路面の凹凸による走行中の車体の変位をセンサーにより検知することによつて、車体の変位に伴う画像の揺れを除去する車両周辺状況表示装置としている。

## 【0005】

【作用】 上記構成の本発明によれば、左右及び後方画像を同時に1つの視点から見たように表示することによって、左右及び後方を走行する車両の動きが一目で把握することができ、危険の事前回避がし易くなる。例えば後方の車両が車線変更をして自車の左または右の車線に進入した場合でも、左右どちらかの画面をみて車両の存在を把握した後、後方の画面を見て、車線変更したことを認識する等の2段階の動作がいらず、車両の動きを連続して把握することができ、周辺道路状況を把握する時間が短くて済む。また、左右側方画像と後方画像の像の大きさを合わせるように、後方画像の縦幅を左右側方画像の縦幅よりも小さくすることによって、左右の画像は仮想視点の近くから見たように映り、後方の画像は仮想視点から遠方に見えるように映る。これにより遠近感が表現される。左右側方画面と後方画面の縦幅の差は、車両の車体前後長を表現する。後方画像にはトランクの後端を、左右側方画像には左右ドアアウター端部を見せるようにすることによって、周囲との距離感が掴みやすくなる。画像サイズが、低速走行時には小さく、高速走行時には大きくなることによって、低速走行時には車両側方の視野角が広がり、より横方向が見やすくなり、市街地等の混雑した道路の把握がし易くなり、高速走行時には、車両側方の視野角は狭くなるが、後方車両との距離感が掴みやすくなる。また、表示画像が、車線変更や交差点での右左折時にウィンカーを出したときに、自車の進行方向の画像にシフトすることによって、より横方向まで映し出すことができ、他車との接触やバイク等の巻き込みを事前に防止し易くなる。また、路面の凹凸に

【0006】

【0009】従って、上記のように左右及び後方の画像を1つの視点37から見たように表示することにより、自転車周辺の道路状況をすばやく把握することができ、危険の事前回避につながる。

(a)に示すように、後方画像が認識できる範囲で画像サイズを縮小した縮小画面51とする。逆に、高速走行では車速が速いため、車線変更をするときは他車との距

離感を掴むことが重要であるが、映っている車の大きさが小さいと距離感を掴みにくい。そこで、(b)に示すように、多少横の情報は削除しても後方面像を拡大した拡大画面52として表示した方がよい。

【0015】また、通常の表示が図13に示すものであったときに、車線変更や交差点での右左折時にウイinkerを出したときには図14に示すように自車の侵入する方向の画像が中央の方へシフトしてきて、より、横方向の画像を確認することができ、他車との接触やバイクの巻き込み等を回避し易くなる。もともと図4に示すように実撮像範囲38は表示領域(画面)3よりも広いため、シフトすればより横の画像を表示することができる。

【0016】以上のような表示を常にクリアに見せるために、路面が凹凸しているところを走行したときにも画面が揺れないように以下のシステムとする。図15

(a)、(b)に示すように、路面からの振動をサスペンション等に取り付けた加速度センサー53により、検知する。その後図16に示すように、ある領域 $\alpha$ の振幅及び周波数の振動をある時間 $t$ 秒間検知すると、画面の揺れを補正する命令が図外のコントロールユニットから出される。補正の命令は検知される振幅、周波数によってマップ化されていて、対応する補正がなされる。しかし、ある領域 $\alpha$ での振幅及び周波数が無い状態が $s$ 秒間検知された場合は補正制御は停止する。尚、実撮像範囲38、39、40は表示領域(画面)3、4、5よりも大きいのでこの分を補正代として使用する。

【0017】

【発明の効果】 以上説明したように、本発明による車両周辺状況表示装置によれば、左右及び後方面像を同時に1つの視点から見たように表示することによって、左右及び後方を走行する車両の動きが一目で把握することができ、危険の事前回避がし易くなる。例えば後方の車両が車線変更をして自車の左または右の車線に侵入した場合でも、左右どちらかの画面をみて車両の存在を把握した後、後方の画面を見て、車線変更したことを認識する等の2段階構えの動作がいらず、車両の動きを連続して把握することができ、周辺道路状況を把握する時間が短くて済む。また、左右側方面像と後方面像の像の大きさを合わせるように、後方面像の縦幅を左右側方面像の縦幅よりも小さくすることによって、左右の画像は仮想視点の近くから見たように映り、後方の画像は仮想視点から遠方に見えるように映る。これにより遠近感が表現される。左右側方面面と後方面面の縦幅の差は、車両の車体前後長を表現する。後方面像にはトランクの後端を、左右側方面像には左右ドアアウト端部を見せるようにすることによって、周囲との距離感が掴みやすくなる。画像サイズが、低速走行時には小さく、高速走行時には大きくなることによって、低速走行時には車両側方の視野角が広がり、より横方向が見やすくなり、市街地等の混

雑した道路の把握がし易くなり、高速走行時には、車両側方の視野角は狭くなるが、後方車両との距離感が掴みやすくなる。また、表示画像が、車線変更や交差点での右左折時にウイinkerを出したときに、自車の進行方向の画像にシフトすることによって、より横方向まで映し出すことができ、他車との接触やバイク等の巻き込みを事前に防止し易くなる。

【0018】また、路面の凹凸による車体の変位を加速度センサーにより検知し、表示画像にフィードバックし、画像の揺れを除去することにより、常にクリーンな車両周辺画像を見ることができる。

【図面の簡単な説明】

【図1】 本発明の車両周辺状況表示装置の組み付け状態を示す図である。

【図2】 本発明の車両周辺状況表示を示す図である。

【図3】 カメラ設置位置を示す図である。

【図4】 CCDカメラによる実撮像範囲を示す図である。

【図5】 左右及び後方面像の合成の手順を示す図である。

【図6】 左右及び後方面像の合成の手順を示す図である。

【図7】 左右及び後方面像の合成の手順を示す図である。

【図8】 左右及び後方面像の合成の手順を示す図である。

【図9】 左右及び後方面像の合成の手順を示す図である。

【図10】 自車表示状態を示す図である。

【図11】 合成の手順その2を示す図である。

【図12】 低中速及び高速走行時の表示を示す図である。

【図13】 ウイinker表示前の画面を示す図である。

【図14】 ウイinker表示後の画面を示す図である。

【図15】 加速度センサー取り付けの概略図を示す図である。

【図16】 画面揺れ補正のフローチャートを示す図である。

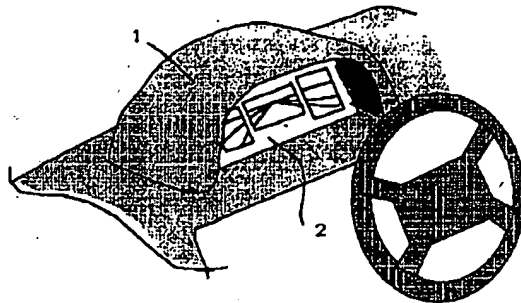
【図17】 従来例を示す図である。

【符号の説明】

- 1 メータクラスター
- 2 液晶パネル
- 3 左側方面面
- 4 右側方面面
- 5 後方面面
- 6 無限遠点
- 7 無限遠点
- 9 無限遠点
- 10 白線
- 11 白線

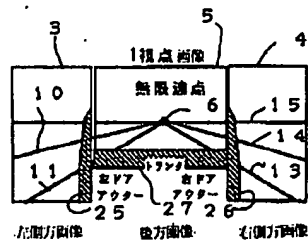
- 13 白線
- 14 白線
- 15 地平線
- 25 左ドアアウト端部
- 26 右ドアアウト端部
- 27 トランク端部
- 31 左側方CCDカメラ
- 32 右側方CCDカメラ
- 33 後方CCDカメラ
- 34 カメラ31の視野角
- 35 カメラ32の視野角
- 36 カメラ33の視野角
- 37 仮想視点
- 38 カメラ31の実撮像範囲
- 39 カメラ32の実撮像範囲

【図1】

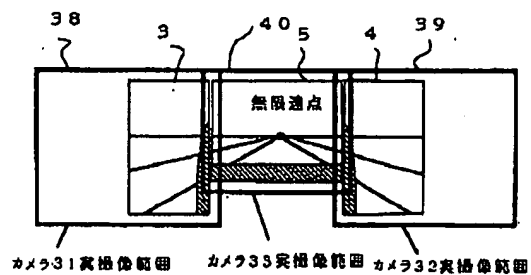


- 40 カメラ33の実撮像範囲
- 41 左側方画像
- 42 後方画像
- 43 右側方画像
- 44 後方車両像
- 45 後方車両像
- 46 車両像
- 47 左右側方画像縦寸法
- 48 画像カット領域
- 49 画像ダブリ領域
- 50 自車表示
- 51 縮小画像サイズ
- 52 拡大画像サイズ
- 53 加速度センサー

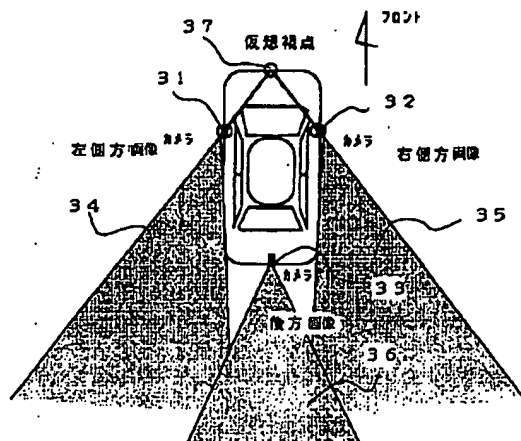
【図2】



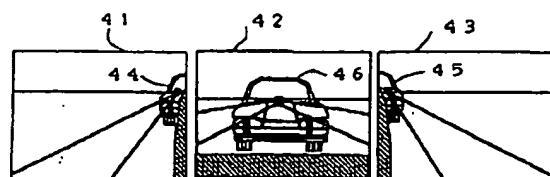
【図4】



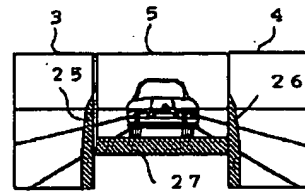
【図3】



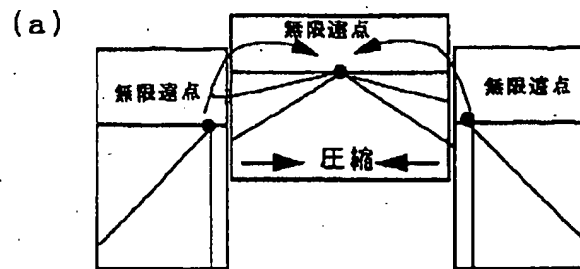
【図5】



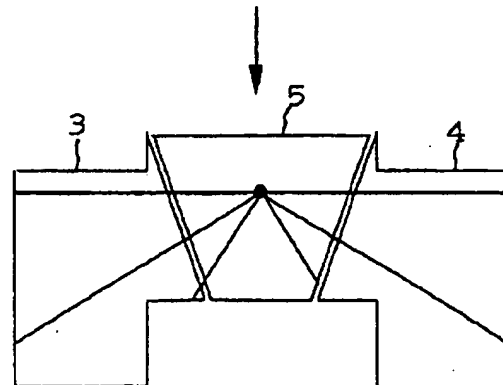
【図7】



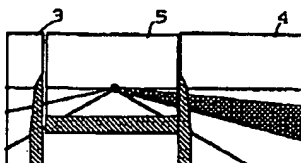
【☒ 1 1】



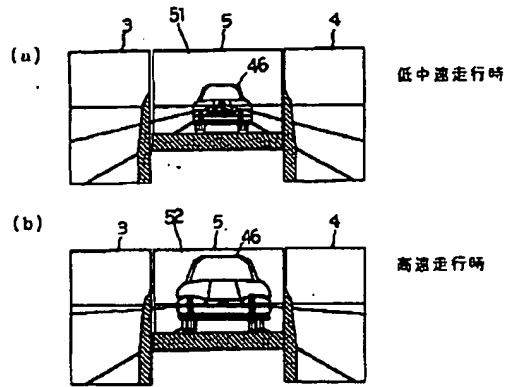
(b)



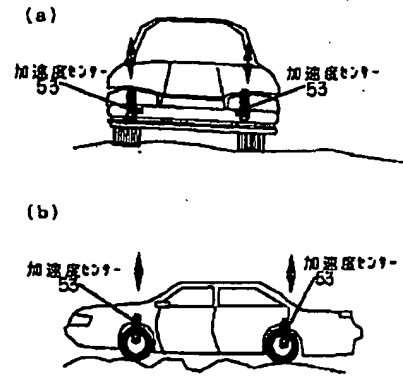
【图 14】



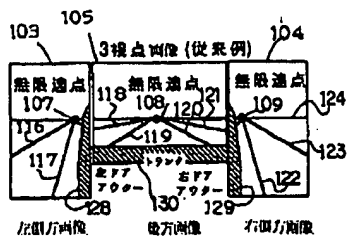
【図12】



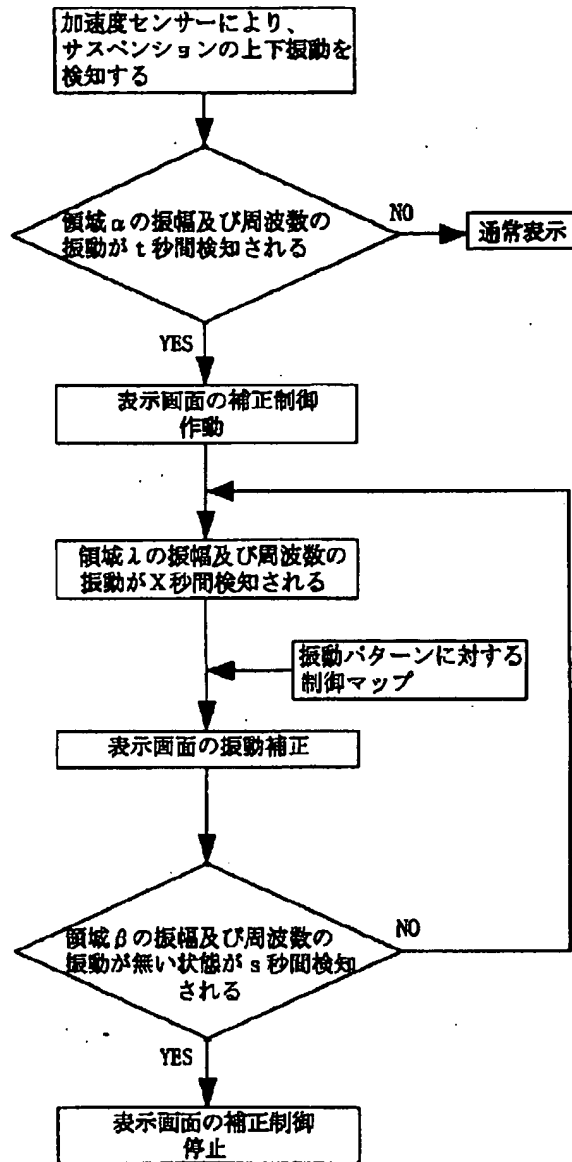
【図15】



【図17】



【図16】





## PATENT ABSTRACTS OF JAPAN

(11)Publication number : **10-257482**

(43)Date of publication of application : **25.09.1998**

(51)Int.Cl.

H04N 7/18  
B60K 35/00  
B60R 1/00  
G08G 1/16

(21)Application number : **09-058718**

(71)Applicant : **NISSAN MOTOR CO LTD**

(22)Date of filing : **13.03.1997**

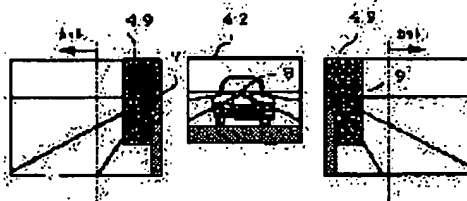
(72)Inventor : **KUMAMOTO KENJI**

### (54) VEHICLE SURROUNDING CONDITION DISPLAY DEVICE

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide the left, right and rear road conditions as continuous information and to instantaneously grasp the entire conditions by matching the infinite far points of three left side, right side and rear images at least and synthesizing the left side, right side and rear images so as to watch from one virtual viewpoint.

**SOLUTION:** When the left, right and rear sides of vehicle are photographed by CCD cameras having the same view angle, the vehicle positioned back in the relation of distance between the camera and the vehicle is projected a little smaller for the lateral image and projected a little larger for a rear image 42. Therefore, in order to display the image just like watching from one viewpoint (from the front side of vehicle, for example), the rear image 42 is reduced so as to match the size of image projected in the rear image 42 with the size of image projected in left and right side images. Then, the outside part of left and right side images is cut while considering the form of meter cluster, afterwards, one part 49 of left and right side image overlapped with the rear image 42 is cut, image processing is performed so as to match infinite far points 7, 8 and 9 of three images and one viewpoint image is prepared.



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[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the car circumference situation display equipment which displays especially the image of right and left and back on coincidence on a liquid crystal panel about the equipment which displays the circumference situation of a car.

[0002]

[Description of the Prior Art] As an approach of grasping the situation of the car exterior, it is the mainstream [ according to / the side / according to a room mirror in back / mainstream / fender mirror / a door mirror or ] of a current commercial vehicle. Other than this, a part of graphic display to the liquid crystal panel of the instrument panel by the CCD camera is also then exhibited as utilization or a prototype. For example, there are what displays the image of the right-and-left side photoed with the CCD camera and back on the boundary line on a windshield and the top face of an instrument panel, and a thing as which the image of the vehicle approached with warning when the vehicle has approached is displayed.

[0003]

[Problem(s) to be Solved by the Invention] However, the image of the right-and-left side and back projects the above-mentioned conventional display independently, and a driver requires time amount in order to grasp all circumference situations and to have to recognize each one image of every. If it says about what displays the image of the right-and-left side photoed with the CCD camera of the above-mentioned conventional example, and back, each screens are separated and it is necessary to see near and each screen to the function of a room mirror and a door mirror. If it says about what it approaches and the image of a vehicle is displayed as with warning, only the side or a back screen will be displayed and it will be hard to grasp the whole. It is making the whole easy to make this invention in view of the conventional trouble, and for the purpose to acquire right and left and a back road situation as continuous information in an instant, and to grasp.

[0004]

[Means for Solving the Problem] In order that this invention may attain said purpose, the infinite point of at least three images of the right-and-left side and back is doubled. So that image composition of the right-and-left side and the posterior part image may be carried out as seen from one virtual view, and the magnitude of the image of a right-and-left side image and a back image may be doubled. The dip of a back image is made smaller than the dip of a right-and-left side image. Image size at the time of low medium-speed transit By it being small and enlarging at the time of high-speed transit, shifting to the image of the direction at which the image displayed on a panel turns at the same time it takes out a blinker, and detecting the variation rate of the car body under transit by the irregularity of a road surface by the sensor It is considering as the car circumference situation display equipment from which the shake of the image accompanying the variation rate of a car body is removed.

[0005]

[Function] According to this invention of the above-mentioned configuration, a motion of the car which

runs right and left and back can grasp at a glance, and it becomes easy to carry out prior evasion of risk by displaying that right and left and a back image saw from one view on coincidence. the back case where the car made a lane change and advances into the left of a self-vehicle, or a right lane -- right and left -- after seeing one of screens and grasping existence of a car, actuation of the two step style of seeing a back screen and recognizing having made a lane change cannot be not needed, a motion of a car can grasp continuously, and the time amount which grasps a circumference road situation is short, and ends. Moreover, by making the dip of a back image smaller than the dip of a right-and-left side image, an image on either side is reflected as seen from near the virtual view, and a back image is reflected so that it may be visible far away from a virtual view, so that the magnitude of the image of a right-and-left side image and a back image may be doubled. Thereby, depth perception is expressed. The difference of the dip of a right-and-left side screen and a back screen expresses the car-body order length of a car. It becomes easy to hold a sense of distance with a perimeter by showing the back end of a trunk as a back image, and showing a right-and-left door outer edge as a right-and-left side image. Although the angle of visibility of the car side becomes easy to carry out breadth and grasp of the road which was [ city area ] congested by a longitudinal direction becoming legible more at the time of low-speed transit and the angle of visibility of the car side becomes narrow at the time of high-speed transit when image size is small at the time of low-speed transit and becomes large at it at the time of high-speed transit, it becomes easy to hold a sense of distance with a back car. Moreover, when a display image takes out a blinker at the time of the right and left chip box in lane modification or a crossing, it can project to a longitudinal direction more and becomes easy to prevent contamination, such as contact on other vehicles, and a motorbike, in advance by shifting to the image of the travelling direction of a self-vehicle. Moreover, an always clean car circumference image can be seen by detecting the variation rate of the car body by the irregularity of a road surface by the acceleration sensor, feeding back to a display image, and removing the shake of an image.

[0006]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail based on drawing. Drawing 1 is the schematic diagram having shown the attachment situation of the car circumference situation display equipment of the gestalt of operation of this invention. A liquid crystal panel 2 is fundamentally embedded in the front of a driver, and the meter cluster 1, and a car circumference situation is displayed on a liquid crystal panel 2. A liquid crystal panel 2 can display various information, such as the vehicle speed and an engine speed, besides a car circumference situation. Drawing 2 shows the car circumference situation display of this invention displayed on a liquid crystal panel 2, and the display screen consists of a method screen 3 of left-hand side, a method screen 4 of right-hand side, and a back screen 5. The image displayed on each screen is photoed with the CCD camera attached in the car body.

[0007] One proposal of a camera installation location is shown in drawing 3. It installs in a right-and-left door mirror with 31 and 32 two CCD cameras, and 33 is installed near a trunk one CCD camera. CCD camera 31 is an angle of visibility 34 about the method image of left-hand side, in CCD camera 32, the method image of right-hand side is photoed with an angle of visibility 35, and CCD camera 33 photos a back image with an angle of visibility 36. Here, as those images are shown in drawing 17 by the conventional approach, one infinite point 107 exists in the image of the method screen 103 of left-hand side, one infinite point 109 exists also in the image of the method screen 104 of right-hand side, and one infinite point 108 exists also in the image of the back screen 105. That is, three images have an infinite point in each, and the image of three screens is not continuing. Therefore, in order to grasp a surrounding road situation, it must recognize the image of right and left and back at a time according to [ one ] an individual, and time amount will be taken. In addition, as for a left door outer and 129, 128 in drawing is [ a right door outer and 130 ] the trunk back end. Moreover, the white line on a road surface [ in / in 116,117 / the image of the method screen 103 of left-hand side ], the white line on a road surface [ in / in 122,123 and 124 / the image of the method screen 104 of right-hand side ] and a horizon, and 118,119,120,121 are the white lines on the road surface in the image of the back screen 105.

[0008] In the display of this invention shown in drawing 2 as the cure, the infinite points 107, 108, and

109 of the conventional example shown in drawing 17 were collected to one infinite point 6, and as seen from one virtual view 37 (refer to drawing 3), the image of three screens 3, 4, and 5 was compounded. For example, the white line 116 and white line 118 path on the street in drawing 17 turn into a white line 10 in drawing 2, and white lines 117 and 119 turn into a white line 11. Similarly, a white line 123 and a white line 121 turn into a white line 14, and a white line 122 and a white line 120 turn into a white line 13. 15 is a horizontal line.

[0009] Therefore, by displaying that the image of right and left and back was seen from one view 37 as mentioned above, the road situation around a self-vehicle can be grasped quickly, and it leads to prior evasion of risk.

[0010] The image captured with the CCD camera considers the thing of 3:4 displayed on a liquid crystal panel that it is oblong and as greatly as possible, and cuts and displays a longitudinal direction rather than the real image pick-up range of a right-and-left side image. In drawing 4, although the real image pick-up range of the method of left-hand side is a frame 38, a display is taken as the magnitude shown on said method screen 3 of left-hand side. The real image pick-up range 39 makes the method of right-hand side similarly the magnitude shown on the method screen 4 of right-hand side. The back real image pick-up range 40 is not carried out, but displays a large cut in the magnitude which reduced the image captured mostly as it was, and was shown on said back screen 5.

[0011] Then, one composite procedure is explained. If car right and left and back are photoed with the CCD camera of the same angle of visibility, and especially an image processing is not carried out, as shown in drawing 5, to the car 46 which is present in a certain location, by the right-and-left images 41 and 43, it will be reflected more smallish, and will be more greatly reflected by the back image 42. This is because the distance from a camera to the car is different. Since the body which is in the location same for displaying as seen from one view 37 (refer to drawing 3) must be the same magnitude, it reduces the back image 42 in order to make the magnitude of the image 46 reflected in the back image 42 meet the images 44 and 45 reflected in the right-and-left side images 41 and 43. If drawing 6 - drawing 10 R> 0 explain image composition processing for this, in order to project the image beside a car in as large the range as possible, the lengthwise direction of a right-and-left side image is arranged to the lengthwise direction maximum width 47 of a liquid crystal panel 2. If the configuration of the meter cluster 1 is taken into consideration, a right-and-left side image will not have been settled and an outside 48 will be cut. then, it is with the back image 42 -- some beaten right-and-left side images 49 are cut, an image processing is performed and 1 view image is created like drawing 9 so that infinite points 7, 8, and 9 may be doubled.

[0012] The edges 25 and 26 of a door outer are reflected in a right-and-left side image, and it is made for the trunk back end 27 to be reflected in a back image at this time. This becomes easy to grasp a sense of distance with other vehicles. Moreover, the difference of the dip of the right-and-left side screens 3 and 4 and the back screen 5 shows car-body order length, and is expressing depth perception. This level difference can also be used like drawing 10, and a self-vehicle can also be expressed by CG50.

[0013] (Gestalt of other operations) Hereafter, although the gestalt of other operations is explained, the same sign is given to the same component as the gestalt of said operation, and the explanation is omitted.

[0014] A composite procedure (a) and (b) are shown in drawing 11 as a gestalt of other operations. Deformation of the screen of the side is lessened. (a) and (b) show the display screen at the time of the vehicle speed being low medium speed, and the time of being a high speed to drawing 12. Low medium speed is mainly street transit. In such a comparatively crowded situation, when making a lane change, other vehicles are running horizontally in many cases. Therefore, it is necessary to get to know the road situation beside a self-vehicle to a wide angle as much as possible. Then, at the time of low medium speed, as shown in (a), it is made into the reduced screen 51 which reduced image size in the range which can recognize a back image. On the contrary, to high-speed transit, since the vehicle speed is quick, when making a lane change, it is important to hold a sense of distance with other vehicles, but if the magnitude of the vehicle in which it is reflected is small, it will be hard to hold a sense of distance. Then, it is better to display as an expansion screen 52 which expanded the back image even if it deleted

the information on horizontal somewhat, as shown in (b).

[0015] Moreover, when the usual display is what is shown in drawing 13, when a blinker is taken out at the time of the right and left chip box in lane modification or a crossing, as shown in drawing 14, the image of the direction upon which a self-vehicle trespasses shifts to central one, and a lateral image can be checked and it becomes easier to avoid contact on other vehicles, the contamination of a motorbike, etc. As shown in drawing 4 from the first, since the real image pick-up range 38 is wider than a viewing area (screen) 3, if it shifts, a horizontal image can be displayed more.

[0016] In order to always show the above displays clear, also when it runs the place as for which the road surface is carrying out irregularity, it considers as the following systems so that a screen may not shake. As shown in drawing 15 (a) and (b), it detects by the acceleration sensor 53 which attached the vibration from a road surface in the suspension etc. As shown in drawing 16 after that, a certain instruction which will amend the shake of a screen if it detects for time amount  $t$  seconds is taken out from the control unit outside drawing in vibration of the amplitude of a certain field  $\alpha$ , and a frequency. The instruction of amendment is map-ized by the amplitude and frequency which are detected, and corresponding amendment is made. However, when the condition that there are no amplitude and frequency in a certain field  $\alpha$  is detected for  $s$  seconds, amendment control stops. In addition, since the real image pick-up range 38, 39, and 40 is larger than viewing areas (screen) 3, 4, and 5, it uses at this rate as a molding allowance.

[0017]

[Effect of the Invention] As explained above, according to the car circumference situation display equipment by this invention, a motion of the car which runs right and left and back can grasp at a glance, and it becomes easy to carry out prior evasion of risk by displaying that right and left and a back image saw from one view on coincidence. the back case where the car made a lane change and trespasses upon the left of a self-vehicle, or a right lane -- right and left -- after seeing one of screens and grasping existence of a car, actuation of the two step style of seeing a back screen and recognizing having made a lane change is not not needed, a motion of a car can grasp continuously, and the time amount which grasps a circumference road situation is short, and ends. Moreover, by making the dip of a back image smaller than the dip of a right-and-left side image, an image on either side is reflected as seen from near the virtual view, and a back image is reflected so that it may be visible far away from a virtual view, so that the magnitude of the image of a right-and-left side image and a back image may be doubled.

Thereby, depth perception is expressed. The difference of the dip of a right-and-left side screen and a back screen expresses the car-body order length of a car. It becomes easy to hold a sense of distance with a perimeter by showing the back end of a trunk as a back image, and showing a right-and-left door out edge as a right-and-left side image. Although the angle of visibility of the car side becomes easy to carry out breadth and grasp of the road which was [ city area ] congested by a longitudinal direction becoming legible more at the time of low-speed transit and the angle of visibility of the car side becomes narrow at the time of high-speed transit when image size is small at the time of low-speed transit and becomes large at it at the time of high-speed transit, it becomes easy to hold a sense of distance with a back car. Moreover, when a display image takes out a blinker at the time of the right and left chip box in lane modification or a crossing, it can project to a longitudinal direction more and becomes easy to prevent contamination, such as contact on other vehicles, and a motorbike, in advance by shifting to the image of the travelling direction of a self-vehicle.

[0018] Moreover, an always clean car circumference image can be seen by detecting the variation rate of the car body by the irregularity of a road surface by the acceleration sensor, feeding back to a display image, and removing the shake of an image.

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[Translation done.]

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**PRIOR ART**

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[Description of the Prior Art] As an approach of grasping the situation of the car exterior, it is the mainstream [ according to / the side / according to a room mirror in back / mainstream / fender mirror / a door mirror or ] of a current commercial vehicle. Other than this, a part of graphic display to the liquid crystal panel of the instrument panel by the CCD camera is also then exhibited as utilization or a prototype. For example, there are what displays the image of the right-and-left side photoed with the CCD camera and back on the boundary line on a windshield and the top face of an instrument panel, and a thing as which the image of the vehicle approached with warning when the vehicle has approached is displayed.

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[Translation done.]

JAPANESE

[JP,10-257482,A]

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS OPERATION DESCRIPTION OF DRAWINGS  
DRAWINGS

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[Translation done.]



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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the attachment condition of the car circumference situation display equipment of this invention.

[Drawing 2] It is drawing showing the car circumference situation display of this invention.

[Drawing 3] It is drawing showing a camera installation location.

[Drawing 4] It is drawing showing the real image pick-up range by the CCD camera.

[Drawing 5] It is drawing showing the procedure of composition of right and left and a back image.

[Drawing 6] It is drawing showing the procedure of composition of right and left and a back image.

[Drawing 7] It is drawing showing the procedure of composition of right and left and a back image.

[Drawing 8] It is drawing showing the procedure of composition of right and left and a back image.

[Drawing 9] It is drawing showing the procedure of composition of right and left and a back image.

[Drawing 10] It is drawing showing a self-vehicle display condition.

[Drawing 11] composite \*\*\*\* -- it is drawing showing the 2.

[Drawing 12] It is drawing showing the display at the time of low medium speed and high-speed transit.

[Drawing 13] It is drawing showing the screen before a blinker display.

[Drawing 14] It is drawing showing the screen after a blinker display.

[Drawing 15] It is drawing showing the schematic diagram of acceleration-sensor installation.

[Drawing 16] It is drawing showing the flow chart of screen shake amendment.

[Drawing 17] It is drawing showing the conventional example.

[Description of Notations]

1 Meter Cluster

2 Liquid Crystal Panel

3 Method Screen of Left-hand Side

4 Method Screen of Right-hand Side

5 Back Screen

6 Infinite Point

7 Infinite Point

9 Infinite Point

10 White Line

11 White Line

13 White Line

14 White Line

15 Horizon

25 Left Door Out Edge

26 Right Door Out Edge

27 Trunk Edge

31 Method CCD Camera of Left-hand Side

32 Method CCD Camera of Right-hand Side

33 Back CCD Camera  
34 Angle of Visibility of Camera 31  
35 Angle of Visibility of Camera 32  
36 Angle of Visibility of Camera 33  
37 Virtual View  
38 The Real Image Pick-up Range of Camera 31  
39 The Real Image Pick-up Range of Camera 32  
40 The Real Image Pick-up Range of Camera 33  
41 Method Image of Left-hand Side  
42 Back Image  
43 Method Image of Right-hand Side  
44 Back Car Image  
45 Back Car Image  
46 Car Image  
47 Right-and-Left Side Image Length Dimension  
48 Image Cut Field  
49 Image Double Field  
50 Self-Vehicle Display  
51 Contraction Image Size  
52 Expansion Image Size  
53 Acceleration Sensor

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[Translation done.]

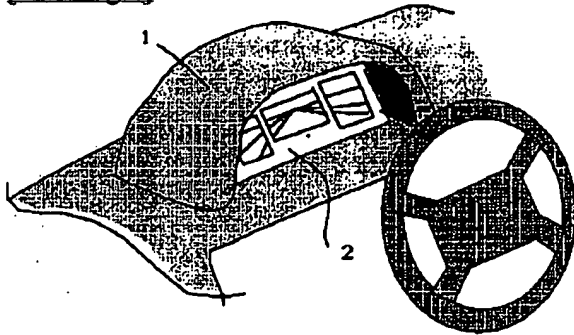
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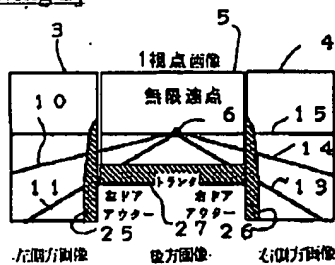
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## DRAWINGS

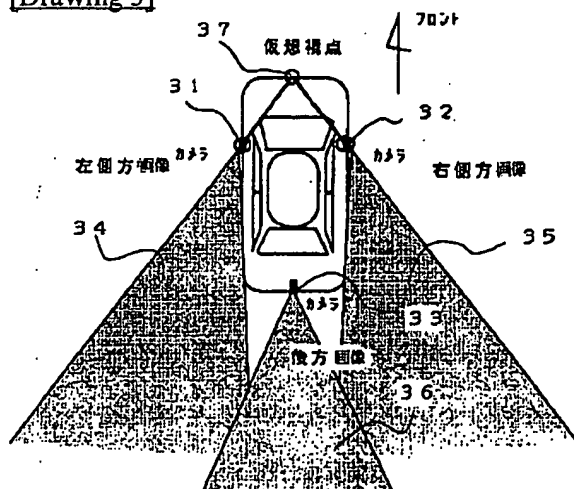
[Drawing 1]



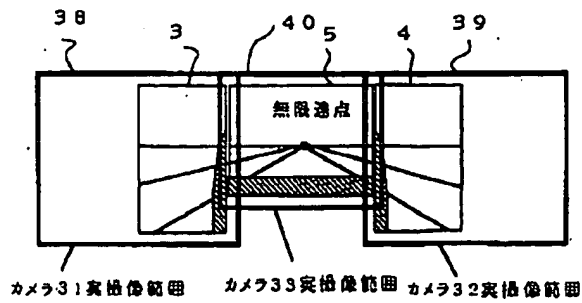
[Drawing 2]



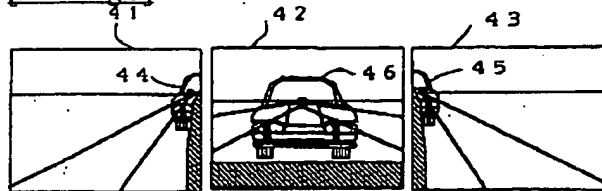
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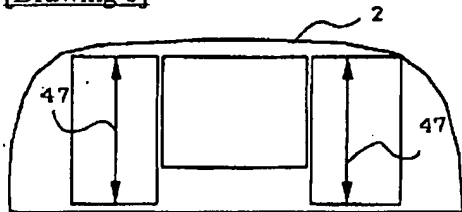
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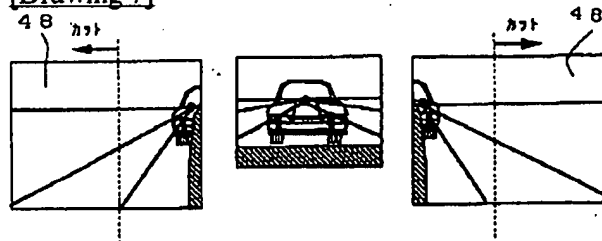
[Drawing 5]



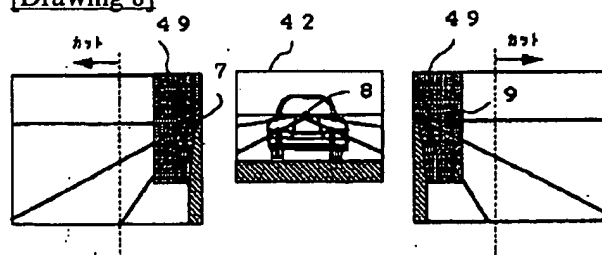
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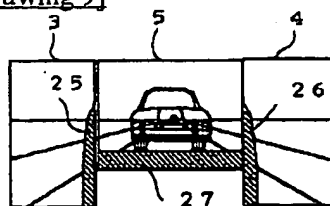
[Drawing 7]



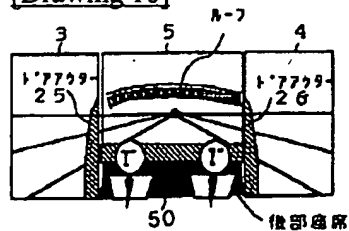
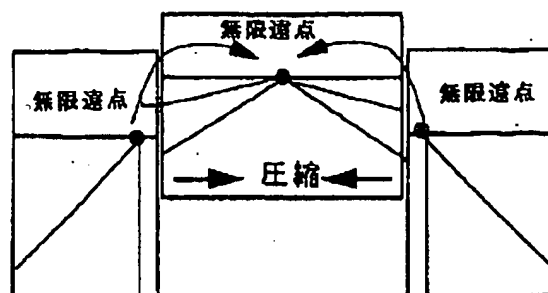
[Drawing 8]



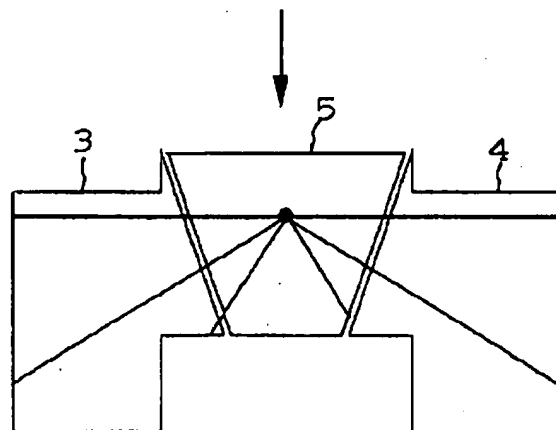
[Drawing 9]



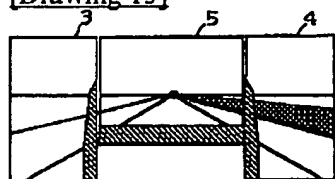
[Drawing 10]

[Drawing 11]  
(a)

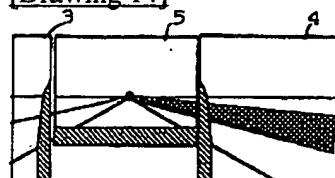
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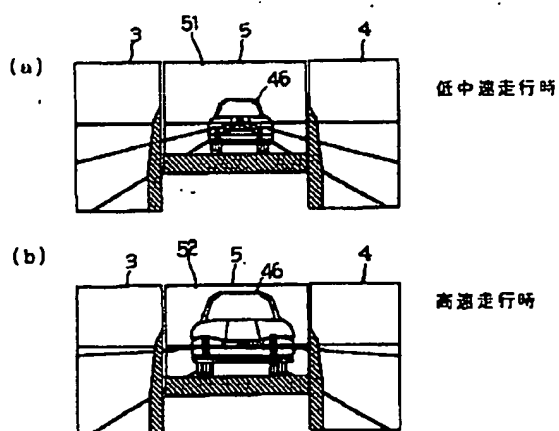
[Drawing 13]



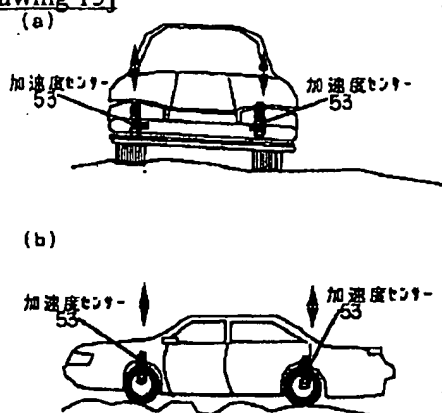
[Drawing 14]



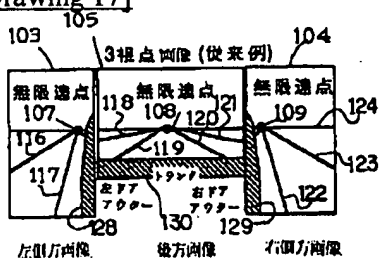
[Drawing 12]



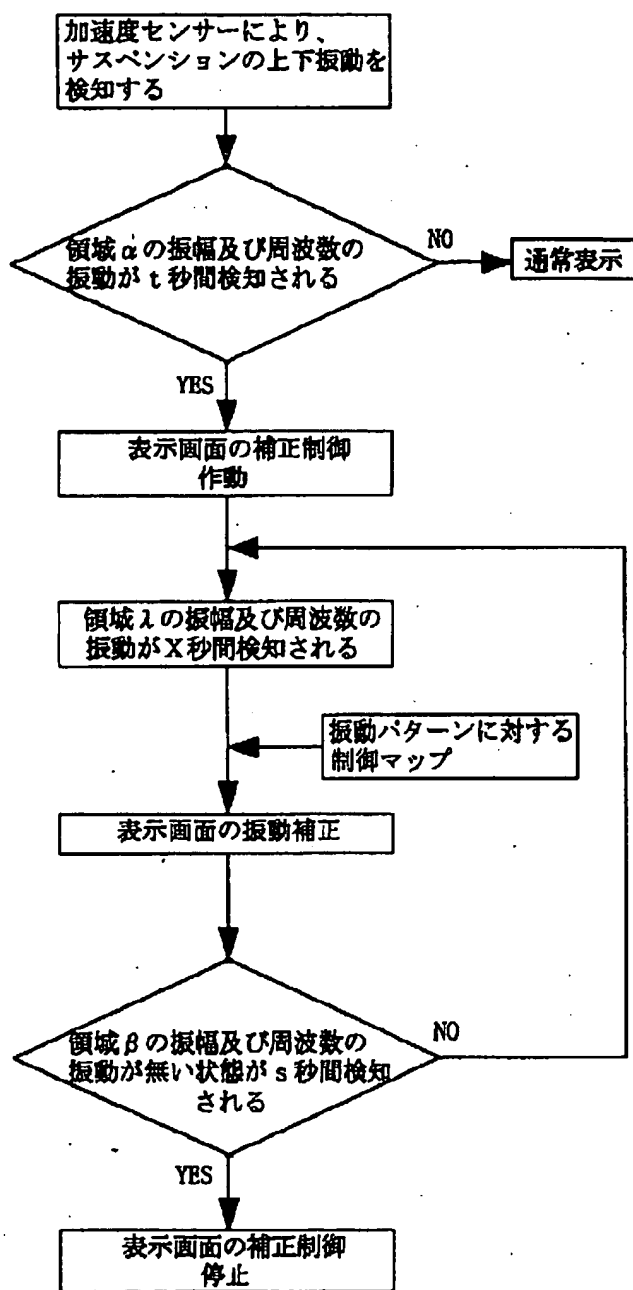
[Drawing 15]



[Drawing 17]



[Drawing 16]



[Translation done.]